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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/824,337

04/13/2004

Tatsuhiko Sato

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28481

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12/12/2006

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EXAMINER

NGUYEN, PHU HOANG

ART UNIT

PAPER NUMBER

1731

DATE MAILED: 12/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/824,337	<b>Applicant(s)</b> SATO, TATSUHIRO	
	<b>Examiner</b> Phu H. Nguyen	<b>Art Unit</b> 1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/13/2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 10-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☒ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/07/2005</u> | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9, 12-25 are drawn to a method for producing a quartz glass jig, classified in class 65, subclass 31.
- II. Claims 10-11 are drawn to a quartz glass jig, classified in class 428, subclass 141.

The inventions are independent or distinct, each from the other because:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case a quartz glass jig can be made by a method comprising vaporization and hydrolyzed in an oxyhydrogen flame, growing and heating in an atmosphere containing gaseous CO.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required

because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Andrew Tiajolloff on November 20<sup>th</sup> 2006 a provisional election was made without traverse to prosecute the invention of group I, claims 1-9,12-25. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-11 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Priority***

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification (37 CFR 1.78).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8, 12-15, 17-20, 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art in view of Takenaka et al. (U.S. Patent No. 6077451), further in view of Honma et. al (JP 07183240). The applicant's admitted prior art teaches a method for producing a quartz glass jig used in a semiconductor industry, quartz glass raw material is made into a desired shape by a flame process or the like, subjected to a strain-removing annealing or the like and then washed to give a product (line 14-16 under Prior Art of this instant application's specification). The applicant's admitted prior art method does not teach subsequent steps of gas phase etching and gas phase purification on a surface layer of the quartz glass jig that will remove impurities. Takenaka discloses etching silicon material while heating it by an etching gas containing fluorine compound, the reaction product is vaporized and distilled off and only the metal impurities contained in the silicon material are collected as a solid residue (line 3-7, column 5). Takenaka also discloses the remaining impurities are dissolved in hydrochloric acid, nitric acid or sulfuric acid (line 23-25, column 5). Furthermore, Honma discloses a process that supplies halogen content gas to a furnace under predetermined processing conditions to purify quartz glass (claim 1 of JP 07183240).

Regarding claim 1, it would have been obvious to one of ordinary skill in the art at the time the invention was made to produce a glass jig with reduced metal impurity by a method comprising preparation of quartz glass raw material, flame process, stress removal annealing process, gas phase etching step, gas phase purification step and

washing as taught by the combination of applicant's admitted prior art, Takenaka et al. (U.S Patent No. 6077451) and Honma et al. (JP 07183240).

Regarding claim 2, gas phase etching and gas phase purification steps are both gas phase steps that etches silicon and removes remaining metal impurity respectively. Since these two steps essentially remove different material that made up the surface of the quartz glass, they can be carried out simultaneously to save processing time.

Regarding claim 3, annealing is a heat treating step where a quartz glass is heat up to a temperature and hold then ramp down so that the surface and internal of the glass can start to cool down at temperature below strain point to remove permanent stress. Honma discloses the purification process by using hydrogen chloride gas at a furnace temperature of 1150 degree C (second to last sentence of the Constitution). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce furnace operating costs by carry out gas phase etching and gas phase purification during the annealing step.

Regarding claim 4, it would be obvious to one of ordinary skill in the art at the time the invention was made to carry out gas phase etching and gas phase purification steps of claim 3 simultaneously to save processing time.

Regarding claims 5,12,17 and 22, Takenaka discloses etching quartz glass using etching gas containing fluorine is preferred to carry out at a temperature of 80 degree C to 130 degree C (line 10-44, column 4). This temperature range is within the temperature range of 0 degree C to 1300 degree C of the instant claims 5, 12,17 and 22. Therefore, it would have been obvious to one of ordinary skill in the art at the time

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the invention was made to carry out gas phase etching with a gaseous atmosphere containing fluorine in a temperature range of from 0 degree C to 1300 degree C.

Regarding claims 6, 13, 18 and 23, Takenaka discloses an etching gas containing a fluorine compound which is selected from the group consisting of xenon fluoride, hydrogen fluoride, oxygen fluoride and halogen fluoride (line 67, column 2 - line 3 column 3) that are overlapping with the group consisting of  $C_xF_y$ ,  $Cl_xF_y$ ,  $N_xF_y$ ,  $Si_xF_y$ ,  $S_xF_y$  (where,  $10 \geq x \geq 1$  and  $10 \geq y \geq 1$ ),  $CHF_3$ ,  $HF$  and  $F_2$  in the instant claims 6, 13, 18 and 23.

Regarding claim 7, 14, 19 and 24, Honma discloses the purification process by using hydrogen chloride gas at a furnace temperature of 1150 degree C (second to last sentence of the Constitution) that is within the temperature range of from 800 degree C to 1300 degree C of the instant claims 7, 14, 19 and 24. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the gas phase purification step with a temperature range of from 800 degree C to 1300 degree C in a gaseous atmosphere containing Cl.

Regarding claim 8, 15, 20, and 25, Honma discloses that hydrogen chloride gas was used as raw gas, if it is halogen content gas, it can use similarly. Furthermore, Honma defines halogen simple substance gas and halogenated compound gas are contained in halogen content gas (last two sentences of paragraph 17 under Detailed Description). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a gaseous atmosphere containing Cl is  $HCl_2$ ,

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Cl<sub>2</sub> or a combination of HCl<sub>2</sub>, Cl<sub>2</sub> since they are both halogen content gas as taught by Honma.

Claims 9,16,21 and 26 are is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art, Takenaka et al. (U.S Patent No. 6077451), Honma et. al (JP 07183240) as applied to claims 5,12,17 and 22 above and further in view of Hays (U.S Patent No. 3511727). The combination of applicant's admitted prior art,Takenaka and Hays did not disclose hydrogen gas as carrier-diluent. Hays discloses inert gases other than hydrogen, such as nitrogen and argon, may be employed as a carrier and diluent. However, the use of carrier-diluents other than hydrogen are not recommended since a preferential attack of certain semiconductor crystal planes may result, thereby producing a rough surface as opposed to the mirror finishes (line 30-37, column 3). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to include hydrogen in the gaseous atmosphere containing F as a carrier-diluent to achieve mirror finishes.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu H. Nguyen whose telephone number is 571-272-25931. The examiner can normally be reached on M-F.

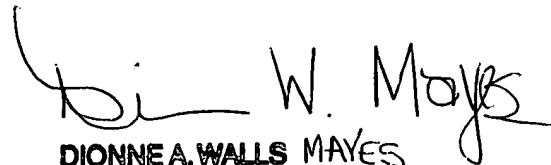
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

P.N  
12/6/2006

  
**DIONNE A. WALLS MAYES**  
**PRIMARY EXAMINER**